

FOREST GENETICS WORK AT MICHIGAN STATE COLLEGE

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The first work at Michigan State College endeavored to secure and produce trees suitable to the wide diversity of planting sites within the state. Professor Beal, and later Professor Bogue, hoped to find species that would produce good wood quality, and at the same time, make growth as rapid or faster than the native species.

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Professor Bogue started a forest nursery in 1904, from which western pines and firs, as well as eastern white, jack, and red pines, and white spruce, were sold for forest planting. Professor Bogue also started an arboretum for his first trials at East Lansing, with the hope that "progeny tests" would follow this early beginning. His selections included the following:

<u>Pinus ponderosa</u> var. <u>scopulorum</u>	<u>Pinus banksiana</u>
<u>Pinus ponderosa</u>	<u>Picea abies</u>
<u>Pinus jeffreyi</u>	<u>Picea engelmanni</u>
<u>Pinus monticola</u>	<u>Pseudotsuga taxifolia</u>
<u>Pinus flexilis</u>	<u>Castanea dentata</u>
<u>Pinus rigida</u>	<u>Larix decidua</u>
<u>Pinus strobus</u>	And others

The majority of these trees lived to produce fruit, and many of them are still alive.

Early in its 50 years of service to the Michigan public, the Forestry Department cooperated with the United States Department of Agriculture, Bureau of Plant Industry, in trials of exotic trees, both deciduous and coniferous. The most promising of these trials were Chinese chestnut, Castanea molissima. Trees of this species reached fruiting age before they were removed to make room for the new building construction following World War II.

Professor Chittenden established a trial plantation of Populus canadensis (which is considered a hybrid between P. nigra and P. tacamahaca) and Populus deltoides, about 1917. These poplars made rapid growth and were later underplanted with white pine, and still later (1946) were harvested for their lumber when the expanding campus overflowed onto their site.

In 1926, Professor Chittenden secured some hybrid poplar cuttings and planted them at the Dunbar Forest Experiment Station at Sault Ste. Marie. These poplars made very rapid growth for three seasons before they succumbed to canker damage and winter injury.

In 1928, Professor Neilson of our Horticulture Department started his nut culture work at East Lansing and continued it later at the W. K. Kellogg Farm near Augusta, Michigan. Professor Neilson did some hybridization work, although the majority of his work was in selection of exotic and native scion wood from promising individuals which he grafted on native rootstocks. A large acreage at the Kellogg Farm was devoted to a "nut orchard." This "nut orchard" has been producing annual crops of nuts for some time. Unfortunately, no one individual has devoted much time to continuing this work since Professor Neilson's death.

The next work at Michigan State was trials of exotic conifers at the W. K. Kellogg Forest near Augusta, where ponderosa, lodgepole, Austrian, and Japanese red pine were established in forest plantations each of one acre or more.

In 1934-35, the Forestry Department secured from E. J. Schreiner, Oxford Paper Company, Oxford, Maine, the following hybrid poplars for trials at East Lansing: Andover, Rumford, Maine, Oxford, Rochester, and Geneva varieties. These hybrid poplars were planted in rows at East Lansing and cultivated. They made very rapid growth, many of them reaching 30 feet and 4 to 5 inches d.b.h. in five years. However, canker infections ruined the plantation about the time they reached interesting size.

In 1941, Scott S. Pauley, then a graduate assistant, experimented with many crosses of deciduous trees at Michigan State College. The war interrupted the fine work he started at Michigan State.

In May 1941, I established a planting of the following hybrid poplars that the Forestry Department secured from the Dow Chemical Company, of Midland, Michigan:

No. 52:	<u>Populus charkowiensis</u>	x	<u>P. nigra plantierensis</u>
No. 57:	<u>Populus fastigata</u>	x	<u>P. sobieriens</u>
No. 69:	<u>Populus angulata</u>	x	<u>P. berolinensis</u>
No. 75:	<u>Populus maximowiczii</u>	x	<u>P. trichocarpa</u>
No. 76:	<u>Populus nigra</u>	x	<u>P. laurifolia</u>
No. 78:	<u>Populus nigra</u>	x	<u>P. laurifolia</u>
No. 94:	<u>Populus charkowiensis</u>	x	<u>P. trichocarpa</u>
No. 97:	<u>Populus petrowskyana</u>	x	<u>P. caudina</u>
No. 99:	<u>Populus rasumowskyana</u>	x	<u>P. incrassata</u>

These poplar hybrids were irrigated and cultivated, and they made a remarkable growth of 6 to 9 feet the first season. These plants were cut back the following spring, and the cuttings produced were used in trials on other college properties.

In 1942, a new plantation of these varieties was established in the nursery on cultivated ground. They were cultivated but received no irrigation, and again made an annual growth of 4 to 6 feet in height. The third year they were 1 to 2 inches in diameter, but leaf rust and cankers were developing on all 9 varieties. During the next two years, practically all the varieties were badly injured by cankers. The plantation was destroyed in 1946 to make room for new classroom buildings.

In April 1942, the Forestry Department initiated a series of hybrid poplar plantings in cooperation with the Dow Chemical Company, testing three new varieties, as well as five of the varieties planted in 1941 and 1942. The test plantings were distributed across the state from north to south at:

The Dunbar Forest Experiment Station, Sault Ste. Marie, Michigan
 The Mancelona Plantation, Mancelona, Michigan
 The Lake City Experiment Station, Lake City, Michigan
 The Kellogg Forest, Augusta, Michigan

The results of these trials as reported by Dr. L. W. Gysel in the Michigan Agricultural Experiment Station quarterly Bulletin, Vol. 32 (1): 156-165, August 1949, are:

1. For each hybrid, the total survival was marked by large differences between test areas and plots. A comparison by test areas showed the survival to be best in the Mancelona plantation where the average for two blocks was 96 percent. Hybrid 31 had the best average survival for all plots.
2. On the average, approximately 60 percent of the stems surviving were original; the remaining were sprouts. All of the surviving stems in the plowed and fitted plots of the Kellogg area were original.
3. The average height and average diameter of the hybrids in plots other than those of the Kellogg area were low. In the plowed and fitted plots of the latter area, the average height of all hybrids was 19 feet and the average d.b.h., 2.5 inches.
4. Some of the factors affecting growth and survival were borer damage, canker damage, climate, and soils.
5. Under the conditions of this experiment, the hybrids tested apparently will be of possible commercial value only in the southern Michigan test area, the Kellogg Forest, on ground which was plowed and fitted before planting and cultivated after planting. Here, on the basis of superior height and diameter growth, hybrids 30 and 48 were the best; however, both were highly infected with the fungi causing canker damage which may decrease future survival and growth.